

The Interestingness of Images

Michael Gygli
ETH Zurich, upicto GmbH
gygli@vision.ee.ethz.ch

Helmut Grabner
ETH Zurich, upicto GmbH
grabner@vision.ee.ethz.ch

Hayko Riemenschneider
ETH Zurich
hayko@vision.ee.ethz.ch

Fabian Nater
upicto GmbH
nater@upicto.com

Luc Van Gool
ETH Zurich, KU Leuven
vangoor@vision.ee.ethz.ch

Problem statement

- What makes an image interesting?
- Can we build a model to predict it?

Summary

- We investigate human interest in photos
- Based on psychological experiments
- We identify cues for interestingness
- Ranking images by interestingness is better than by other cues (e.g. memorability)
- Consistency across individuals is high
- Interestingness ~ what people believe they will remember
- Memorability has no positive correlation
- We build an interestingness predictor based on a set of features
- Performance is demonstrated on 3 datasets of varying context

Applications

- Image retrieval / classification
- Marketing
- Video retrieval / summarization

Computational model

Features

- 1) **Unusualness**
 - Global outliers
 - Composition of parts
- 2) **Aesthetics**
 - Colorfulness
 - Arousal
 - Complexity
 - Contrast
 - Edge distribution
- 3) **General preferences**
 - SVM on GIST
 - SVM on Spatial pyramid
 - SVM on color histograms

Final interestingness

- Whitening
- Linear model
- Feed-forward feature selection

What is human interest?

Literature

Berlyne [1] (1960): Interest is influenced by:

- Novelty
- Conflict
- Uncertainty
- Complexity

Biederman and Vessel [2] (2006): Model based on perceptual pleasure. Interesting when:

- Novel
- Comprehensible
- Natural rather than man-made

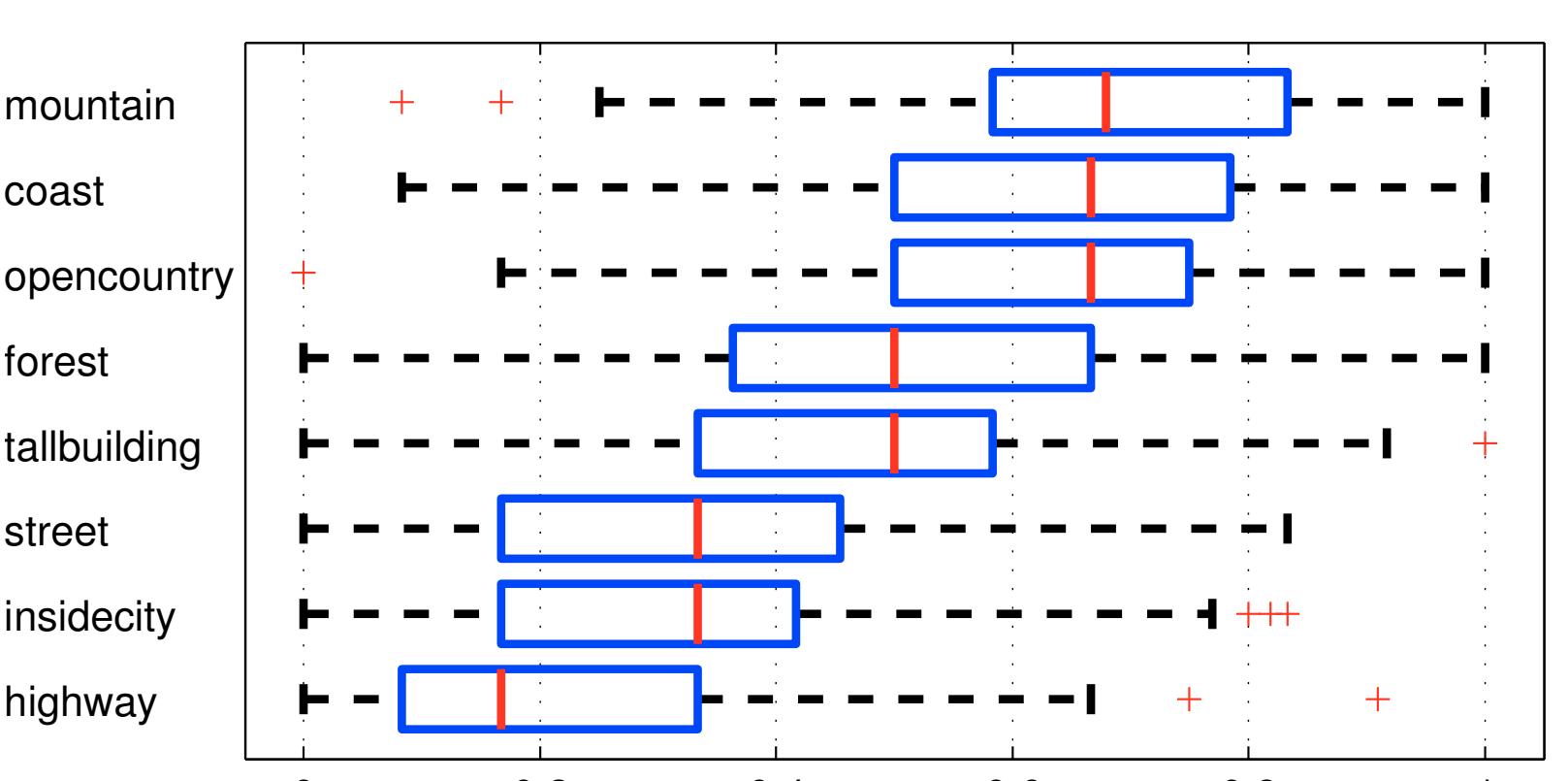


Figure 1. Preference for scene types

Our experiments

Using our data and [3,4] we found:

- High consistency across individuals ($p=0.63$)
- 3 main causes of interest:
 - Unusualness
 - Aesthetics
 - General preferences (Scene types)

Also important are:

- Famousness
- Making happy

Actual memorability and interestingness are negatively correlated.



Figure 2. Example images

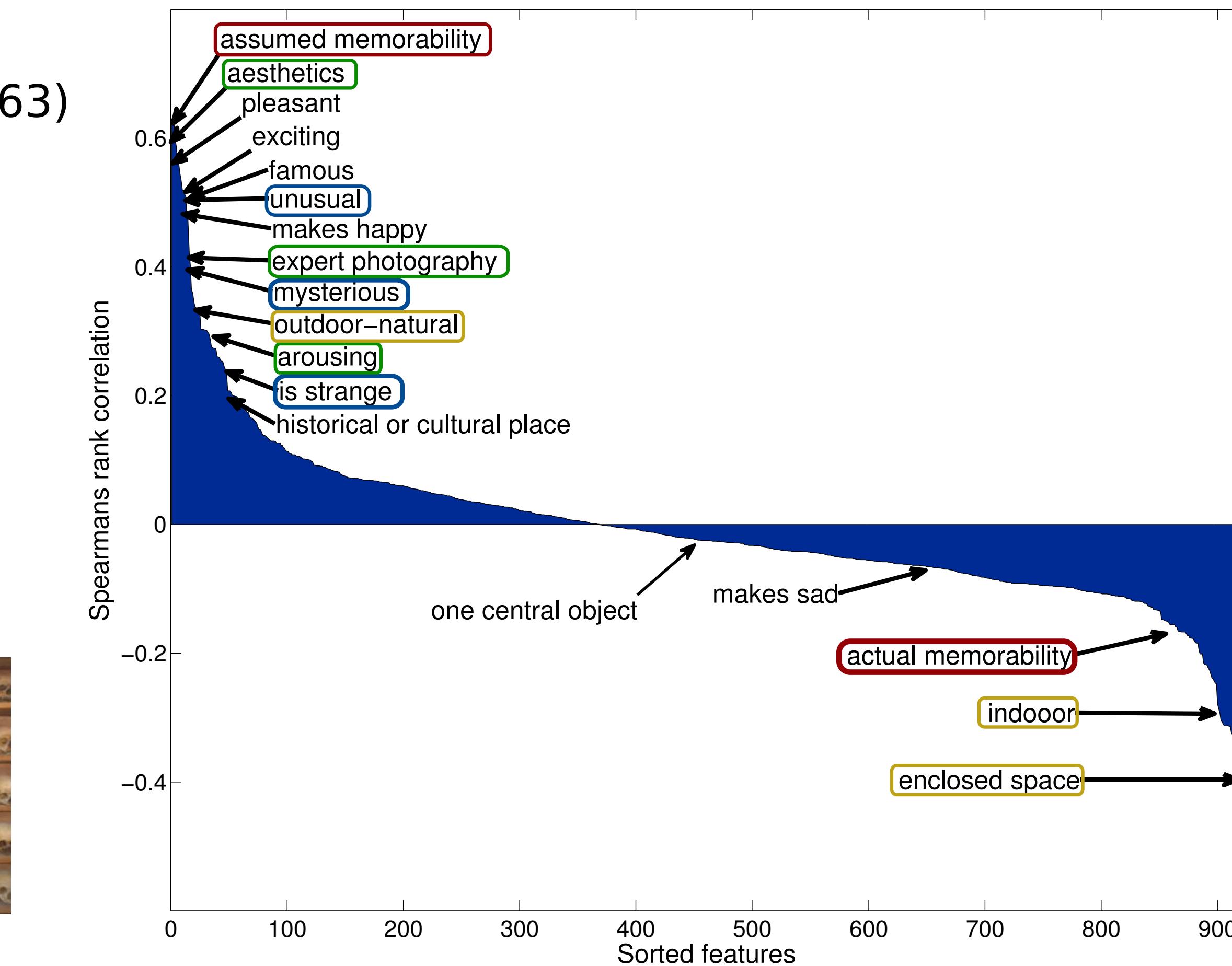


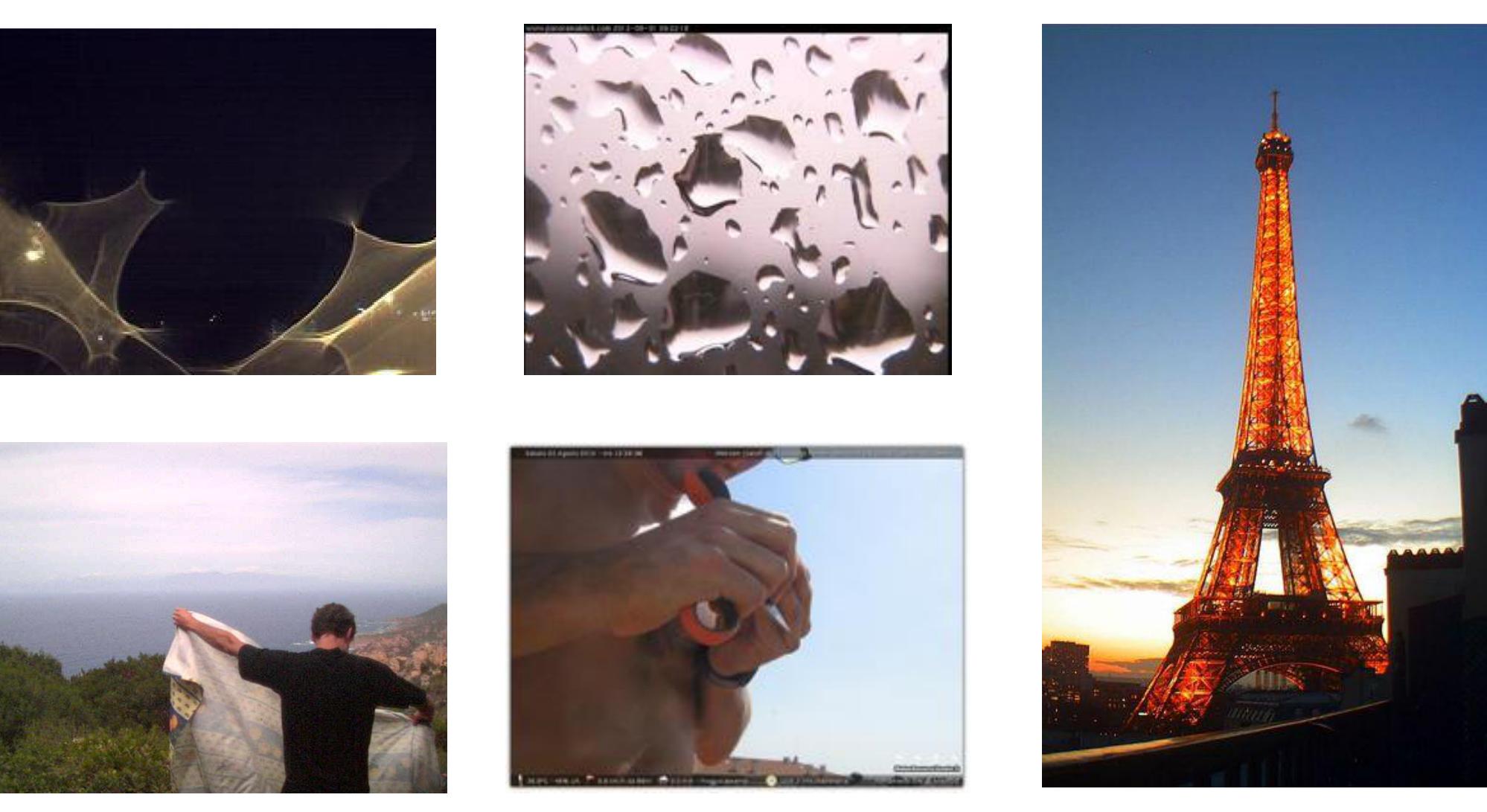
Figure 3. Correlations of interestingness

Webcamaze

- Showcase application
- Detects interesting events in webcam images
- Available for Android



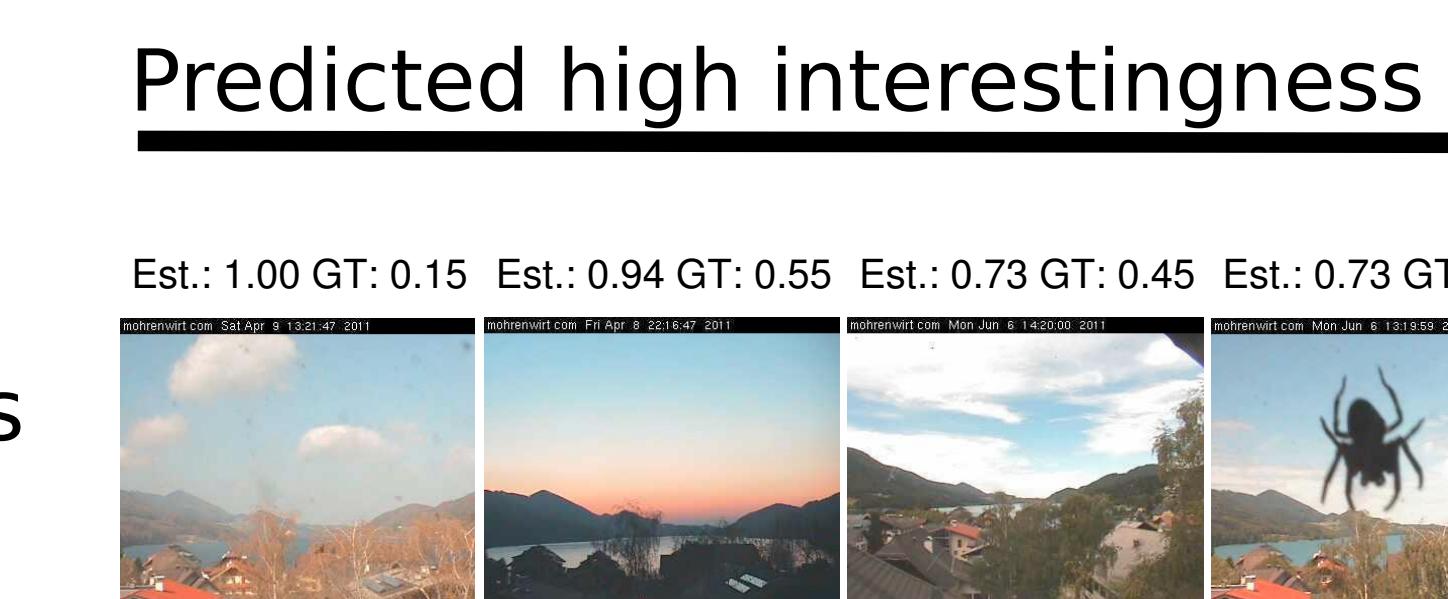
<http://www.webcamaze.com/>



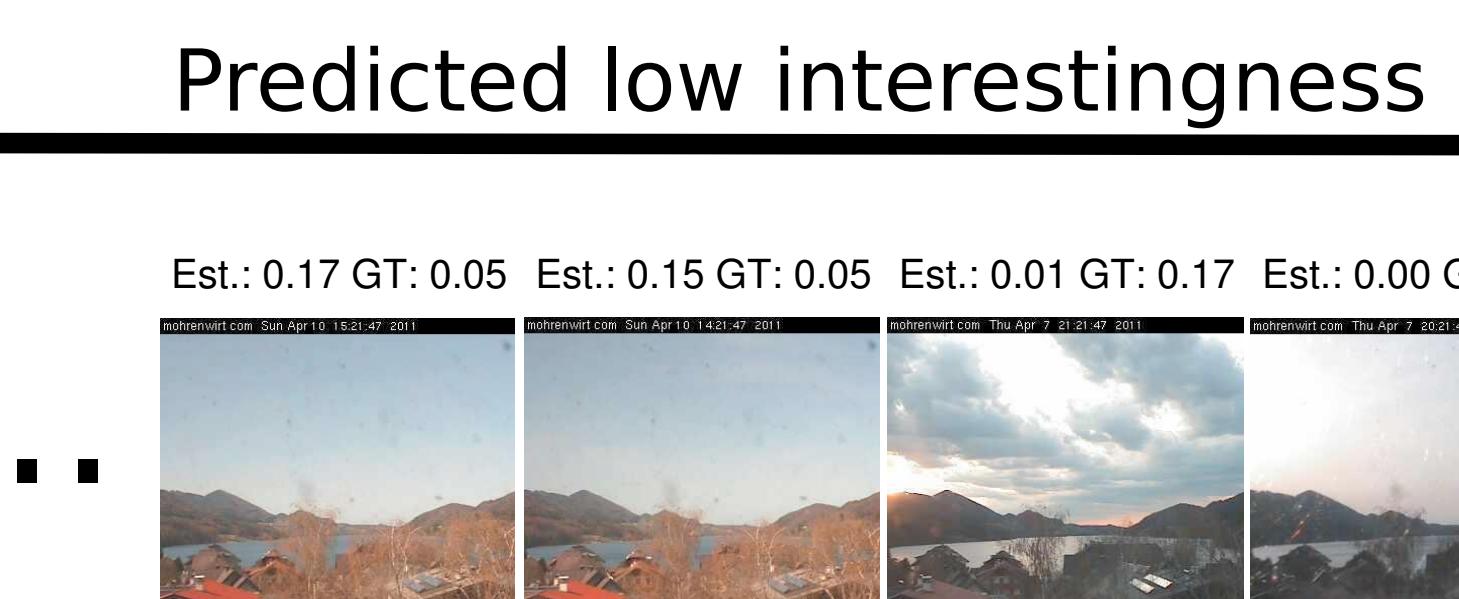
Results

Strong

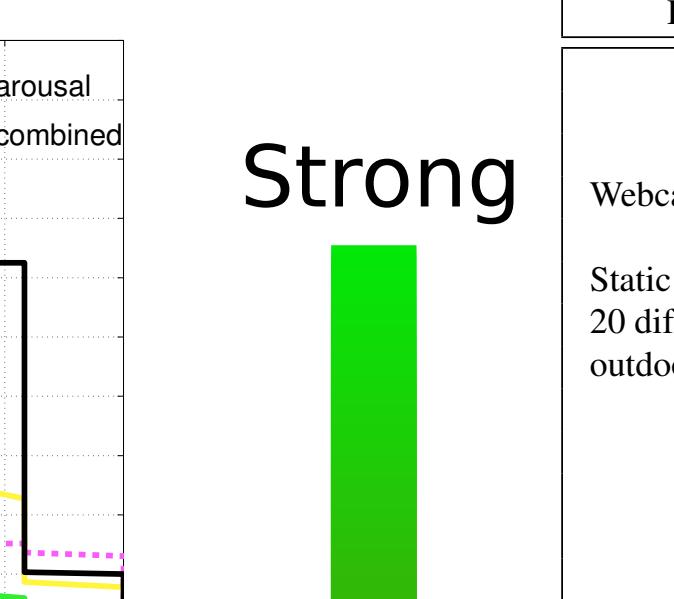
Webcams



Est.: 1.00 GT: 0.15 Est.: 0.94 GT: 0.55 Est.: 0.73 GT: 0.45 Est.: 0.73 GT: 0.75



Est.: 0.17 GT: 0.05 Est.: 0.15 GT: 0.05 Est.: 0.01 GT: 0.17 Est.: 0.00 GT: 0.00



Strong

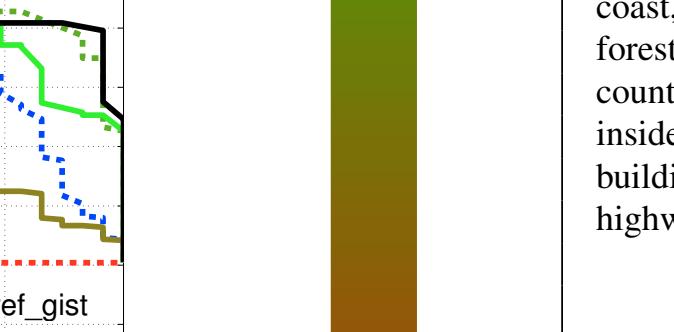
8 Scene categories



Est.: 1.00 GT: 0.58 Est.: 0.98 GT: 0.67 Est.: 0.97 GT: 0.75 Est.: 0.97 GT: 0.58



Est.: 0.10 GT: 0.36 Est.: 0.09 GT: 0.17 Est.: 0.02 GT: 0.00 Est.: 0.00 GT: 0.00



Strong

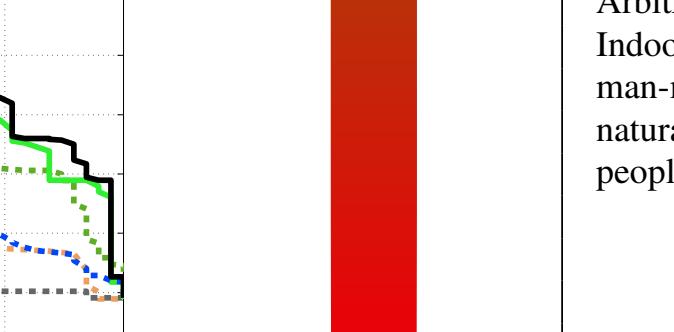
Arbitrary images



Est.: 1.00 GT: 0.87 Est.: 0.97 GT: 0.93 Est.: 0.97 GT: 0.43 Est.: 0.94 GT: 0.86



Est.: 0.08 GT: 0.07 Est.: 0.05 GT: 0.14 Est.: 0.04 GT: 0.14 Est.: 0.00 GT: 0.40



Weak

References

- [1] D. Berlyne. *Conflict, arousal, and curiosity*. McGraw-Hill (1960)
- [2] I. Biederman and E. Vessel. *Perceptual Pleasure and the Brain*. American Scientist (2006)
- [4] A. Oliva, A. Torralba. *Modeling the shape of the scene: A holistic representation of the spatial envelope*. IJCV (2001)
- [3] P. Isola, J. Xiao, A. Torralba, A. Oliva. *What makes an image memorable?* CVPR (2011)
- [5] H. Grabner, F. Nater, M. Druey, L. Van Gool. *Visual Interestingness in Image Sequences*. ACM MM (2013)
- [6] E. Vessel, N. Rubin. *Beauty and the beholder: Highly individual taste for abstract, but not real-world images*. J. of Vision (2010)

Ack.

This work was supported by the European Research Council (ERC) under the project VarCity (#273940) and the Swiss CTI under project #15769.1.

Data

The experimental data is available under:



www.vision.ee.ethz.ch/~gyglim/